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no. 74 cop. 3

UNITED STATES DEPARTMENT OF AGRICULTURE

MISCELLANEOUS CIRCULAR No. 74

WASHINGTON, D. C. SEPTEMBER, 1926

GRADING UP BEEF CATTLE AT SNI-A-BAR FARMS

By

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E. W. SHEETS, Chief, Animal Husbandry Division, Bureau of Animal Industry, H. J. WATERS, representing Sni-a-Bar Farms, and
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UNITED STATES
GOVERNMENT PRINTING OFFICE
WASHINGTON
1928

This circular presents the results of the first 10 years of a 30-year breeding demonstration conducted with beef cattle at Sni-a-Bar Farms, Grain Valley, Mo. The demonstration is the most comprehensive undertaking of its kind, for the purpose of establishing the worth of purebred sires. It was conceived and begun by W. R. Nelson, a public-spirited citizen, whose will provided for its continuance in the interests of better stock breeding.

The breeding operations at Sni-a-Bar Farms are conducted along scientific lines and the public demonstrations held annually at the farms have been attended in recent years by about 10,000 visitors—many from other States—who seek information on livestock improvement through the use of purebred sires. This circular aims to convey the information to those who are unable to visit the farms.

In the preparation of the circular the department acknowledges helpful cooperation of Irwin Kirkwood, of the W. R. Nelson Estate; the late H. J. Waters, who was actively associated in the management of the farms; E. A. Trowbridge, professor of animal husbandry, University of Missouri; W. A. Cochel, representing the American Shorthorn Breeders' Association and adviser in breeding operations; and others. Following Doctor Waters's death, October 26, 1925, Mr. Cochel succeeded him as manager of Sni-a-Bar Farms. The data contained in this circular have been made available to the department and the public through the generosity and assistance of the persons mentioned.

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PURPOSE OF THE WORK

The cattle-breeding demonstration here described shows the results of grading up a herd of native cows with purebred beef bulls. The plan was the conception of the late W. R. Nelson, a lover of good livestock, who believed that systematic breeding with properly chosen purebred sires would quickly improve common herds and eliminate economic waste. Mr. Nelson purchased 1,755 acres of fertile land in Sni-a-Bar Township, Jackson County, Mo., on which the work was begun and is still being conducted. The tract comprises two farms, one of which is devoted chiefly to the production of the purebred sires used in the work and the other to the operation of grading up the main herd.

For convenience in operation, each farm has its own superintendent, but the two properties adjoin and are under one general management. Together they are known as Sni-a-Bar Farms and, for the purpose of the work here discussed, may be considered as a unit. The farms are in a picturesque setting about 26 miles east of Kansas City, on the main road from St. Louis to Kansas City.

BREEDING OPERATIONS BEGUN

Mr. Nelson purchased the property in 1912 and the following year selected 200 "common red cows"—as he called them—at the Kansas City stockyards. These animals, shipped there from Missouri, Kansas, Oklahoma, and Nebraska for slaughter, were the foundation female stock for his breeding operations. Though of uncertain lineage and history, the cows were of fair to good quality, judged from a market standpoint, and of good size. He chose those showing evidence of Shorthorn breeding and also of being reasonably good milkers. The cows were from 4 to 5 years old, most of them with calf and dry; a few had calves at side. This basis for selection insured having animals that would breed.

The equipment and arrangement of the farm were typical of what the average farmer could provide, and Mr. Nelson decided that his stock should have no better feed or care than would be possible on any farm.

The first calves had been sired by whatever bulls the original owners of the cows had used. Those that showed unmistakable evidences of dairy breeding were discarded. Those showing Hereford or Aberdeen-Angus characteristics, though fully the equal of those showing Shorthorn characteristics, were also discarded, because Shorthorn bulls were to be used in the breeding demonstration and it seemed desirable to work with only one breed.

Mr. Nelson had a preference for roan steers, believing that they possessed superior feeding qualities. Since one method of obtaining the roan color is to breed white bulls to red cows, he selected white

FIG. 1.—A group of original cows used as a basis for the grading-up operations. These animals were ordinary red cows but of reasonably good beef type, such as any farmer can pick out at a public stockyard. Compare with improved stock on following pages

Shorthorn bulls to use with the red cows already purchased. Later breeding work, however, included many roan bulls.

The foregoing outline of the project represents the purpose, plan, and progress up to the time of Mr. Nelson's death. He was 71 years old when he acquired Sni-a-Bar Farms, and he completed the selection of the foundation stock only a few months before his death, in 1915. Under the terms of his will, the breeding operations are to continue for 30 years from the time of his death. The work was continued by Mrs. Laura Nelson Kirkwood, as trustee, until her death in February, 1926. Since then it has been carried on by the following trustees appointed by the presidents of the Universities of Missouri, Kansas, and Oklahoma: William Volker, J. Clyde Nichols, and Herbert V. Jones, all of Kansas City, with W. A. Cochel, of the Weekly Kansas City Star, as consultant.

METHODS OF MANAGEMENT

The management and breeding of the Sni-a-Bar herd have proceeded in accordance with the terms of the will and in harmony with the original plans of the founder of the demonstration. The stock is periodically tested for tuberculosis, thus keeping the breeding work on a substantial foundation with respect to health. No serious disease of any kind has interfered with the conduct of the work.

The breeding stock is fed in much the same manner as in 1913, running on pasture during the summer and wintering on hay in open sheds, or in timber. The cows receive no grain. The heifers are bred so that they will calve at about 30 months of age. If calving occurs in the winter, the heifers receive some grain for a short period.

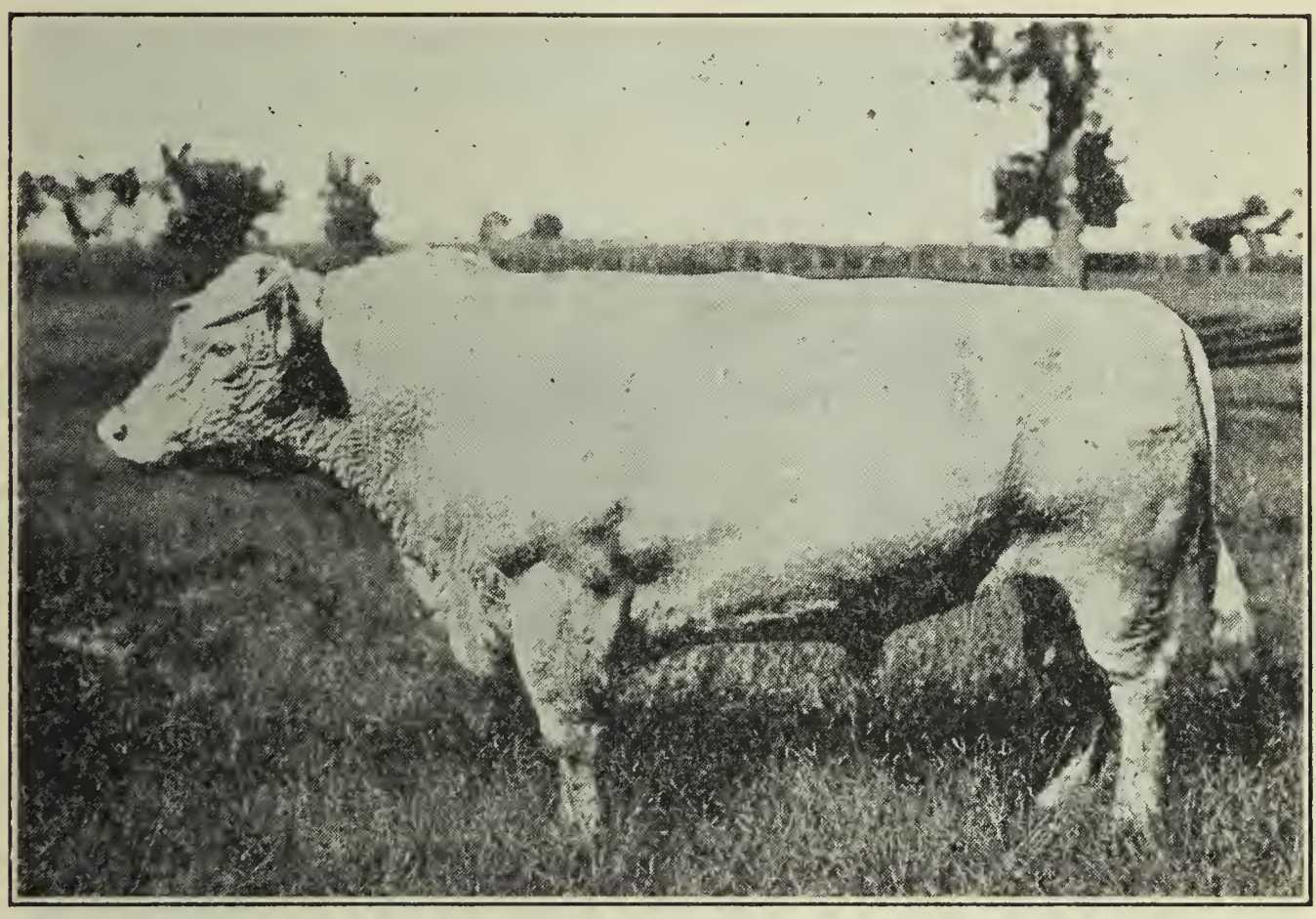

FIG. 2.—Wimple's Villager 548136, a sire used from 1915 to 1922, as he appeared in average breeding condition

The calves have been allowed to run with their dams until weaned, after which they receive a small quantity of grain once a day for about three weeks. Pastures are chiefly bluegrass and white clover, though some fields contain meadow fescue and alsike. The first lots of steers were grazed until they were 15 to 18 months old, after which they were full fed for four to six months and then marketed.

For some five years thereafter the steers were fed from weaning time for from 7 to 10 months and marketed at the age of about 1½ years. Lately the practice has been to begin feeding the calves in a creep, while still nursing, and they are finally marketed at about 800 to 1,100 pounds in weight when 12 to 15 months of age. These changes in method have been due largely to market conditions, especially the preference for beeves finished at an earlier age than when the demonstration began.

ADDITIONAL PURCHASES OF COMMON COWS

In 1916 a second lot of 200 cows similar to the first purchase was added to the herd. The purpose was to increase the extent of breeding operations, thereby making possible the production of fat steers in carload lots and also to obtain a greater quantity of breeding and market data. The cows were selected on the same basis as before, most of them being with calf. The calves, when born, numbered 160 head, a mixed lot of both dairy and beef breeding.

Meanwhile the breeding of the first foundation cows to purebred Shorthorn bulls was well under way and the improved quality of the first-cross calves was evident to such an extent that the farm was attracting visitors. The first public demonstration was held in the fall of 1917, with an attendance of approximately 500 farmers, offi-

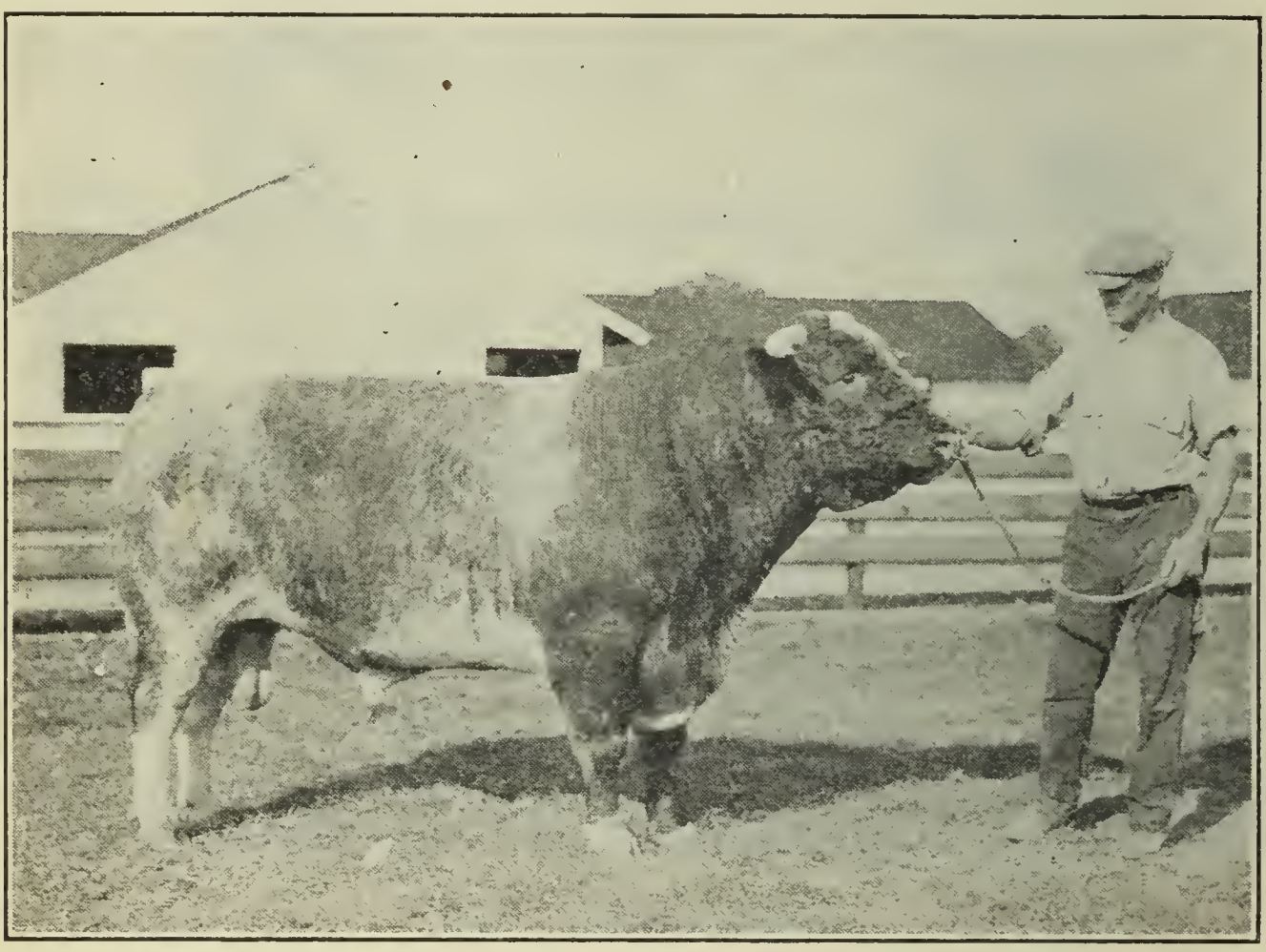

FIG. 3.—Cumberland Sultan 1049622, introduced into the herd in 1922. He has sired many excellent calves

cials, and students. In 1920 a third purchase of common foundation cows became necessary in order to maintain the comparative features of the demonstration work.

WORK GAINS OFFICIAL RECOGNITION

The American Shorthorn Breeders' Association promptly recognized the value and importance of the work and in 1919 established at Sni-a-Bar Farms its first annual field show, held the day before the public demonstration. Officials of the agricultural colleges of Missouri, Kansas, and Oklahoma, and of the United States Department of Agriculture have attended the Sni-a-Bar demonstrations, participating in the speaking programs and giving personal encouragement to the cause for better livestock, which the work represents.

Foreign agricultural officials, officers of farm organizations, county extension agents, and representatives of the meat-packing industry likewise have seen, in the public exhibitions, the marked improvement of cattle through purebred sires.

For convenient examination by visitors on demonstration days the foundation stock and subsequent crosses have been placed in a series of pens, plainly marked and placarded with a description of the animals. When the total number of cattle in a class is too great to show conveniently, average specimens are selected. Animals for exhibition are taken directly from pasture or feed lot, just as the animals of any stock breeder would be shown to visitors. In keeping with the educational purpose of Sni-a-Bar Farms demonstrations, the management has furnished in recent years programs containing

FIG. 4.—Shorthorn bull Prentice 1005345, with calves which he sired. These calves, like others raised at Sni-a-Bar Farms, were early maturing and of good beef type

descriptions of the various groups of stock, with appropriate comments.

The program for demonstration days commonly includes short addresses, luncheon, and inspection of the demonstration cattle. Schools in the locality dismiss their agricultural classes to permit students to attend the event. The accompanying illustrations show typical scenes of the annual demonstrations, held usually about the middle of October, to which the public is invited.

COMPLETE BREEDING RECORDS KEPT

As before stated, additional cows are purchased from time to time as foundation stock to take the place of those culled out or discarded because of advancing age, thus permitting continued demonstrations of a complete series of crosses. By the fall of 1922 the breeding stock at Sni-a-Bar Farms had increased to more than 1,000

head. Every animal raised on the farm is identified by a serially numbered ear tag, which is the key to its history and breeding. Necessarily the records of breeding operations, market returns, and other data relating to the work are detailed and very voluminous. At first it was not deemed practicable to maintain feeding records also, but with increasing interest in this subject the keeping of such data began in 1925. Feeding records on steer calves handled under different methods are now being kept in accordance with arrangements by the United States Department of Agriculture and the University of Missouri.

Sni-a-Bar Farms have not only sold many carloads of market cattle but have successfully exhibited fat stock, including purebred animals, at various shows and exhibitions. Through the courtesy of the trustees of the estate, the records of breeding operations and marketing results described in this publication were made available to the United States Department of Agriculture for study, analysis, and publication. They cover approximately 10 years of systematic breeding and so fully justify the expectations of the far-sighted founder of the enterprise that it seems desirable to give stock owners the benefit of progress made thus far. The results include three complete generations of cattle and part of the fourth and show the practical benefits of grading up a herd of common cows with purebred sires within a period of 10 years.

DESCRIPTION OF HERD SIRES

Table 1 is a list and brief description of the bulls used in conducting the work. Some of the bulls were purchased, others were bred on the farm. All are registered purebreds of the Shorthorn breed. The system of breeding has consisted chiefly in mating to perpetuate good qualities and overcome defects.

MARKETING RESULTS

Table 2 is a summary of the marketing results, showing the various ages and classes of stock sold and prices received. All steer calves have been sold fat in carload lots. For convenience in making comparisons the table includes also the top market price and the average price for bulk of shipments on the day of sale.

To facilitate comparisons of the crosses, animals of similar age and weight are grouped together. However, the fluctuations in market prices during the years in which the cattle were marketed naturally interfere with true comparisons. In order to place the different lots of animals on a strictly comparative basis that eliminates all factors other than their quality, the table includes index numbers in the next to the last column. An index number is a common statistical means for making true comparisons possible. In this case the numbers rate the different lots, using 100 as representing the average price for bulk of sales. The index numbers for the various groups consequently show definitely how each lot of steers compared with the average marketing for that day and all other days.

TABLE 1.—*Sires used in grading up cattle at Sni-a-Bar Farms, arranged according to period of service*

Name and registry number	Color	Sire	Dam	Born	Period of service [1]
Star of the Mist 354219	White	The Choice of All 215050	Violet Mist 6th Vol. 53 P. 536	1909	1912–1917
Liberator 363251	do	Fond Memory 320270	Sultan Fatima 70522	1911	1913–1916
Hampton Cumberland 383228	do	Royal Cumberland 2d 334809	Gipsy Maid 9th 54901	1911	1913–1920
Crescent's Goods 367757	do	Ruberta's Goods 283807	Imported Crescent 8th Vol. 51 P. 712	1911	1913–1917
Imported White Favour 436059	do	Merry Favourite 436058	Gay Millicent 214962	1911	1914–1920
Craibstone Sultan 412057	do	Sultan's Calculator 334973	Craibstone Beauty 3rd 14781	1913	1915–1918
Wimple's Villager 548136	do	Villager 295884	Wimple the 2d 63967	1913	1915–1922
Sni-a-Bar Favour 436061	do	Imported White Favour 436059	do	1914	1916–1921
Orange Stamp 429737	do	Sultan Stamp 334974	Lady Cinderella 3d 75060	1914	1916–1922
Fair Favour 548133	do	Imported White Favour 436059	Fair Lady 138882	1915	1917–1919
Good Stamp 474340	do	Sultan Stamp 334974	Sayer's Rose 101915	1915	1917–1923
Craibstone's Duke 412057	Roan	Craibstone Sultan 412057	Helen Duchess 149571	1916	1918–1920
Kilblean Champion 494952	White	Rusper Champion 425338	Beauty of Kilblean 139773	1916	1918–1920
Combination Stamp 588510	Red and white	Orange Stamp 429737	Combination Blossom 149319	1916	1918–1923
Denmark Archer 494951	White	Village Denmark 334459	Sultan's Sally 15143	1916	1918–1921
Augusta Sultan 2d 494950	Roan	Sultan Stamp 334974	College Augusta 3d 49255	1916	1918–1922
Oakdale Stamp 79366	do	Good Stamp 474340	Oakdale Lavender 180304	1918	1920–1923
Imported Swinton Rosierucian 2d 950329	do	Swinton Blood Royal 893731	Gainford Rosebud 3d 950334	1918	1920–1923
Advance Marshal 583931	do	Village Marshal 427572	Augusta 107th 181212	1918	1920–1923
Crescent's Stamp 793665	White	Good Stamp 474340	Crescent's Blossom 182066	1918	1920–1923
Columbia Stamp 793664	Red	Combination Stamp 588510	Columbia 4th 512688	1919	1921–1923
Parkdale Stamp 793633	Roan	do	Parkdale Emma 3d 242033	1919	1921–1923
Silver King 920688	White	King's Secret 369111	Imported Hindley Nonpareil 2d 771758	1919	1921–1922
Hercules Conqueror 1026690	Roan	Hercules Chancellor 814629	Hercules Elvira 814669	1921	1922
Challenge Cup 1106582	do	Ballylin Rodney 945251	Mayfly (imported) 716230	1921	1922
Edgecote Supreme 1045907	do	Edgecote Toft 649138	Queen of Beauty 40th 576176	1920	1922
Cumberland Sultan 1049622	do	Fair Sultan 494475	Alena Cumberland 512722	1920	1922
Sni-a-Bar Villager 978233	do	Wimple's Villager 548136	Sultana Favour 674840	1919	1922–1923
Butterfly Sultan 937466	do	Augusta Sultan 2nd 494950	Lustre Butterfly 476107	1920	1922–1924
Clipper Sunset 920679	Red	Caledonia 648263	Anoka Clipper 156245	1920	1922–1924
Maxwalton Mariner 1113592	Roan	Rodney 753273	Maxwalton Mina 2d 86601	1921	1922
Richland Augustus 992210	do	Sterling Supreme 596719	Augusta Lily 476598	1920	1922–1923
Villager's Model 985438	do	Parkview Villager 708914	Clara's Best 240527	1920	1922–1924
Argonaut's Master 978230	do	Argonaut 829848	Oaklawn Sally 737156	1920	1923
Diamond Dreadnought 1012666	do	Cudham Dreadnought 860431	Queen of Scots 23d 689431	1920	1923
Anoka Roan Knight 1111533	do	Lothian May Duke 993227	Duchess of Gloster 51 900791	1921	1923–1924
Modest King 950631	do	Kingwood 682218	Modest Princess 2d (imported) 634170	1920	1923–1925
Prentice 1005345	do	Harvieston Grandee 732379	Pearlette 717724	1921	1923–1924

[1] Absence of final date signifies that sire was still in service at end of 1925.

TABLE 2.—*Market data of Sni-a-Bar beef cattle, 1914–1924*

YEARLINGS

Lot No.	Stock	Date marketed	Number	Average weight	Prices day of sale			Comparison with average bulk of sales		Remarks
					Sale price	Top price	Average bulk of sales	Increase or decrease over bulk	Index number (bulk=100)	
				Pounds	*Per cwt.*	*Per cwt.*	*Per cwt.*	*Per cwt.*		
1	Original	Nov. 31, 1914	7	650	$7.40	$9.75	$9.125	−$1.725	81	Best steers from original cows.
2	First cross	May 30, 1916	20	1,032	10.40	10.65	9.875	+.675	105	
3	do	May 23, 1922	15	1,115	8.25	8.85	8.30	−.05	100	Fed with No. 4, second cross.
4	Second cross	do	15	1,107	9.00	9.00	8.25	+.75	109	Top for year to date.
5	First, second, or third cross	June 22, 1920	13	1,203	17.00	17.00	16.25	+.75	105	Top for day.
6	do	May 11, 1921	18	1,151	9.00	9.00	8.175	+.825	110	Top for month.
7	do	Dec. 20, 1921	12	987	9.00	10.00	6.975	+2.025	129	
8	do	July 28, 1922	15	1,117	10.50	10.50	8.55	+1.95	123	Top for year to date.
9	do	Dec. 15, 1922	23	1,100	13.75	13.75	11.625	+2.125	118	Do.
10	do	Aug. 21, 1923	38	1,071	12.25	12.50	11.50	+.75	107	
11	do	Apr. 24, 1924	15	1,194	12.00	12.00	9.525	+2.475	126	Do.
12	do	June 3, 1924	17	1,174	11.50	11.50	9.45	+2.05	122	Top for month.
13	do	Aug. 20, 1924	15	1,076	11.50	11.50	9.25	+2.25	124	Do.
14	do	do	5	948	9.50	11.50	9.25	+.25	103	Culls from No. 13.
	LONG YEARLINGS									
15	Original	July 28, 1922	5	947	$8.75	$10.50	$8.55	+$0.25	102	Fed with No. 8 (improved steers).
16	First cross	May 2, 1917	20	1,105	12.25	12.60	11.425	+.825	107	
17	First, second, or third cross	Dec. 10, 1918	17	1,250	19.50	19.50	13.55	+5.95	144	Top for day and week.
18	do	do	3	1,073	16.50	19.50	13.55	+2.95	122	Culls from No. 17.
19	do.[1]	Jan. 11, 1921	31	1,207	11.00	11.00	8.75	+2.25	126	Top for day and week.
	2-YEAR-OLDS									
20	Original	Nov. 3, 1914	4	1,107	$7.50	$9.75	$9.125	−$1.625	82	Best steers from original cows.
21	do.[2]	Jan. 3, 1916	28	1,460	8.75	9.35	8.425	+.325	104	Long-fed fat steers from original cows.
22	First cross	May 30, 1916	20	1,306	10.65	10.65	9.875	+.775	108	Top for month.
23	do	Dec. 13, 1916	40	1,134	11.00	11.50	9.625	+1.375	114	
24	First, second, or third cross	Feb. 6, 1918	16	1,325	13.75	13.75	11.675	+2.075	118	Top for year to date.
25	do	June 5, 1918	12	1,253	17.50	17.50	16.00	+1.50	109	Top for two months.
26	do	do	6	1,198	16.40	17.50	16.00	+.40	102	Culls from No. 25.
27	do	Mar. 26, 1919	19	1,207	18.50	18.50	15.375	+3.125	120	Top for day and week.
28	do	do	5	1,116	16.00	18.50	15.375	+.625	104	Culls from No. 27.
29	do	June 15, 1920	28	1,413	17.00	17.00	16.375	+.625	104	Top for day and week.
30	do	Dec. 20. 1921	5	1,190	10.00	10.00	6.975	+3.025	143	Do.

[1] This lot is designated " short 2-year-olds."

[2] This lot marketed at Chicago, all others at Kansas City.

These groups show how the management actually marketed the cattle; the practical stockman probably would market them in much the same manner; that is, he would not keep all crosses separate. There were not enough of the second and third crosses for market at any one time to make separate shipments advantageously. In each case all the cattle sold on the open market are included. Steers that were fitted for show and exhibited have been excluded, because these cattle were finished to a higher degree than is practicable for commercial stock. Such animals, because of their superior finish and the fact that they were shown and perhaps won premiums, bring a more or less abnormal price, which the producer of market cattle would not expect to receive. For these reasons all such steers have been omitted from the table. The presentation also omits animals sold for breeding purposes or disposed of through outlets not connected with the work of grading up the demonstration herd.

Out of some 200 head of male calves of the original breeding, 44 were fattened as steers. They were fully fattened and carried as much finish as feeding would give them. These steers were marketed in 1914, 1916, and 1922. Most of them were 2-year-olds, others being yearlings and long yearlings. In no case did the selling price for shipments of any of these groups reach the top price for bulk of sales. If they had equaled that price the day they were sold they would have brought $5,140.36. They sold for $4,660.11, or $480.25 less. Details of the sales of these steers are shown in Table 2.

Beginning February 6, 1918, second-cross steers were added to the marketings. This was continued to and including May 23, 1922, which was the end of marketing first and second cross steers alone; at that time third-cross steers were added to the marketings. In the period stated, 215 steers were sold. Out of a total marketing of these steers, only 15 head sold below the top for bulk of sales. The remaining 200 sold above the top, thereby bringing a substantial premium. The net amount above the bulk-of-sales top for the entire marketing of the 215 steers has been calculated to average more than $9 a head for the entire number. It will be recalled that the steers from original cows sold for considerably below the corresponding basis for comparison.

The significance of the large quantity of information in Table 2 is more clearly evident in Table 3, which is a condensation of the data. Table 3 presents average results in marketing all classes of steers and shows the approximate returns which good breeding brings, in comparison with prices for the bulk of ordinary cattle sold on the same market.

The figures in the last column of Table 3 show very clearly the differential due to improved breeding. The figures are index numbers multiplied by 10. The result is a series of figures readily understood by persons accustomed to studying market reports, but also maintaining the mathematical accuracy of index numbers as a means for true comparisons. The convenient decimal number $10 per hundredweight for an average steer is used as the base figure. The reader will note that the first cross with a purebred beef sire added $2 a hundredweight to the selling price, and the average of three crosses represented $1 a hundredweight more, making a total gain of $3 per hundredweight. This is a direct financial measure of improved breeding.

TABLE 3.—*Summary of Sni-a-Bar market data, 1914–1924*

Kind of stock [1]	Number of steers	Average weight	Market price when average steer marketed is worth $10 per hundredweight
		Pounds	
Original (3 lots)	16	857	$8.80 (−$1.20)
First cross (5 lots)	115	1,139	10.80 (+ .80)
First, second, and third cross (20 lots)	313	1,179	11.80 (+ 1.80)

[1] A few specially fattened lots are omitted.

Table 3 shows that the greatest single step toward quality and better market returns occurs in the first cross. This should be gratifying to persons seeking to derive greater income from their cattle by adopting the use of purebred sires and who naturally wish to derive early financial benefits following their investment in one or more purebred bulls.

IMPROVEMENT IN SUCCESSIVE CROSSINGS

In the first cross there is a greater difference between the quality of the sire and the dam than in any subsequent crosses, and this accounts for the very marked improvement shown pictorially and by market returns. The improvement in subsequent crosses is not so marked in color, breed characteristics, and market returns as in the first cross, but it continues nevertheless. It is seen usually in added thickness and evenness of flesh, early maturing quality, smoothness of finish, refinement of head and shoulder, and the shortening of the legs.

One must not expect that the third and fourth crosses will show equally marked improvement in market value. Improvement becomes more and more difficult as the number of top crosses increases, until the point is reached beyond which the use of only the most superior sires available will result in further superiority. But long before that point has been reached a herd possessing unusual merit will have been produced and the owner will be satisfied with the outcome if he is so fortunate as to maintain its excellence, to say nothing of lifting it to higher levels.

"The point of greatest interest in all the work to the general farmer," Doctor Waters stated in discussing the results, "is briefly this: Beginning with cows of medium quality and breeding, the first generation sired by a purebred bull possessed sufficient quality when fully fattened closely to approximate the top of the market, and two crosses of such sires produced offspring that in 8 out of 10 cases sold substantially above the bulk-of-sales top."

The market results presented are in close agreement with known facts about heredity. The first cross means the infusion of 50 per cent pure breeding, whereas subsequent crosses mean additional infusions of 25 per cent, 12½ per cent, 6¼ per cent, etc. The same knowledge illustrates further why a purebred sire is superior to a grade; the latter obviously has a smaller proportion of pure breeding to transmit.

COMPARISON OF TWO TYPICAL LOTS

Besides the figures already shown, it is of interest also to consider smaller groups that are known to be strictly comparable. The marketing of July 28, 1922, when two lots were sold, is such an instance. One lot consisted of 5 steers of common breeding, the best of the steers from some foundation cows purchased in 1920. The other group was a car lot of 15 head of first, second, and third cross steers.

The steers in the two lots were almost exactly the same age. All had been born on Sni-a-Bar Farms, had run in the same pastures, and had been fed together.

The steers of common breeding averaged 947 pounds, whereas those sired by purebred bulls averaged 1,117 pounds, a difference of 170 pounds. The common steers brought $8.75 a hundredweight on the same market at which the steers sired by purebred bulls sold for $10.50. The common lot sold for $1.75 a hundredweight under the top market price; the other brought the top price, a difference of $17.50 for a 1,000-pound steer.

A part of this difference in weight and selling value was due to the fact that the steers of unknown breeding were not finished, notwithstanding they had had exactly the same opportunity as those of better breeding that were finished. One of the important advantages of well-bred animals is the rapidity with which they gain and the earliness with which they are ready for market, in both of which ways production costs were lowered.

THE WORTH OF A GOOD BULL

Records of the sale of Sni-a-Bar steers furnish a dependable guide for estimating the value of a good bull. It is seen from Table 3 that the first-cross steers marketed, taken altogether, brought $2 a hundredweight more than if they had been of the same quality and breeding as the original steers. Since the dams of the two lots of calves were essentially the same and the methods of feeding and marketing were identical, the difference of $2 a hundredweight in their value, on the basis of the same live weight, may be fairly attributed to the superiority of the purebred sires used at Sni-a-Bar Farms to those used on the farms from which the foundation cows were purchased.

Assuming the low average of 1,000 pounds live weight for the animals, an increase of $2 a hundredweight in the value at marketing time of the offspring of a purebred bull brings an increased value of $240 a year on a crop of 12 calves, making the fair assumption that the heifers improved equally with the steers. That is practically the increase in return on the capital invested in a bull, for the cost of keeping a grade bull is not essentially different from that of keeping a purebred animal.

Probably the greatest preventable loss in American animal production is in the low quality of the sires used. In no other phase of animal husbandry is it possible to make such direct, such marked, and such profitable improvement at such slight cost as in the use of superior purebred sires.

SHOW WINNINGS OF DEMONSTRATION CATTLE

In addition to the evidence of quality as shown by market returns, frequent show winnings of Sni-a-Bar Farms cattle are convincing proof that the animals are of the desired beef type recognized by judges of livestock. Although the development of show stock has been incidental to the main purpose of the demonstration, the list of winnings has increased steadily. Following is a partial list of Sni-a-Bar steers which have won prizes in the fat-cattle classes of State fairs and livestock shows where competition is keen:

Sni-a-Bar Surplus, (second cross), white, calved September 16, 1922. Sire, Crescent Stamp 793665. First and champion steer, Central States Fair, Aurora, Ill., 1924, grades and Aberdeen-Angus steers competing. Second, Michigan State Fair, 1924, all breeds competing. Second in open, and first in class, Shorthorn Special, International Livestock Exposition, 1924.

Sni-a-Bar Aviator, (second cross), roan, calved January 5, 1923. Sire, Butterfly Sultan 937466. First in class, International Livestock Exposition, 1923.

Sni-a-Bar Laddie. (second cross), roan, calved January 19, 1923. Sire, Augusta Sultan 2nd 494950. One of the first-prize group, American Royal Livestock Show, 1924, in competition with purebred Shorthorn steers. Second in class in Shorthorn Special, International Livestock Exposition, 1924.

Sni-a-Bar Knight, (third cross), roan, calved September 14, 1923. Sire, Argonaut's Master 978230. First in class in Shorthorn Special, International Livestock Exposition, 1924.

Sni-a-Bar Snowball (second cross), white, calved January 6, 1924. Sire, Cumberland Sultan 1049622. First and champion American Royal Livestock Show, 1924, all purebred Shorthorns competing. Champion Shorthorn, Southwestern Exposition and Fat Stock Show, Fort Worth, Tex., 1925. Champion Shorthorn, Western Livestock Show, Denver, Colo., 1925. Second in class at Central States Fair, 1924, grades and Aberdeen-Angus competing; second at Michigan State Fair, 1924, all breeds and grades competing.

Sni-a-Bar Guardsman (second cross), roan, calved February 14, 1924. Sire, Anoka Roan Knight 1111533. First and champion, grades competing, American Royal Livestock Show, 1925. Second in open and champion, Shorthorn Special, International Livestock Exposition, 1925. First, New York State Fair, all breeds competing, 1925. Second, Missouri State Fair, 1925, grades competing.

Sni-a-Bar Marvel (second cross), white, calved February 15, 1924. Sire, Prentice 1005345. First in purebred and grade class, American Royal Livestock Show, 1925. Champion grade steer, Missouri State Fair, 1925. Champion grade, Central States Fair, 1925. Champion of all breeds, Ohio State Fair, 1925.

Sni-a-Bar Favourite (third cross), roan, calved September 20, 1924. Sire, Prentice 1005345. First in class, American Royal Livestock Show, 1925; second in class Shorthorn Special, International Livestock Exposition, 1924.

Sni-a-Bar Premier (third cross), calved January 3, 1925. Sire, Argonaut's Master 978230. First in class and one of first-prize group, American Royal Livestock Show, 1925. Third in class, International Livestock Exposition, 1925.

VISIT TO A DEMONSTRATION

Having in mind the purpose of the breeding work and results already described, the reader will obtain a clearer conception of the enterprise by a trip—actual or descriptive—to a typical demonstration. Approaching the farm by motor car over a concrete road, we observe, half a mile away, a scene not unlike a county fair. In a 40-acre field is a large tent where cooks are preparing the noonday luncheon for the guests at the demonstration. Parking our car along with more than 2,000 others, we proceed to the cattle pens. Here are 13 good-sized inclosures in which we see the results of the demonstration almost at a glance. The specimen cattle on exhibition are

typical representatives of larger numbers in the farm pastures. Already thousands of visitors are on the grounds, studying the animals and the signs explaining the breeding of each group.

Pen 1.—We approach the first pen. Here are the bulls in service—eight of them, all registered Shorthorns in vigorous breeding condition. "In selecting these bulls," the attendant tells us, "emphasis was laid on thickness of flesh, smoothness, and constitutional vigor. They are believed to be the type of bull that will further improve the future descendants of the original cows."

"These bulls do not appear to be in show condition," you remark.

"That's right!" the attendant replies, "they are just in good breeding condition, as farmers desire. They have run with the cows all summer, as would be the case on a practical farm, which we intend this to be."

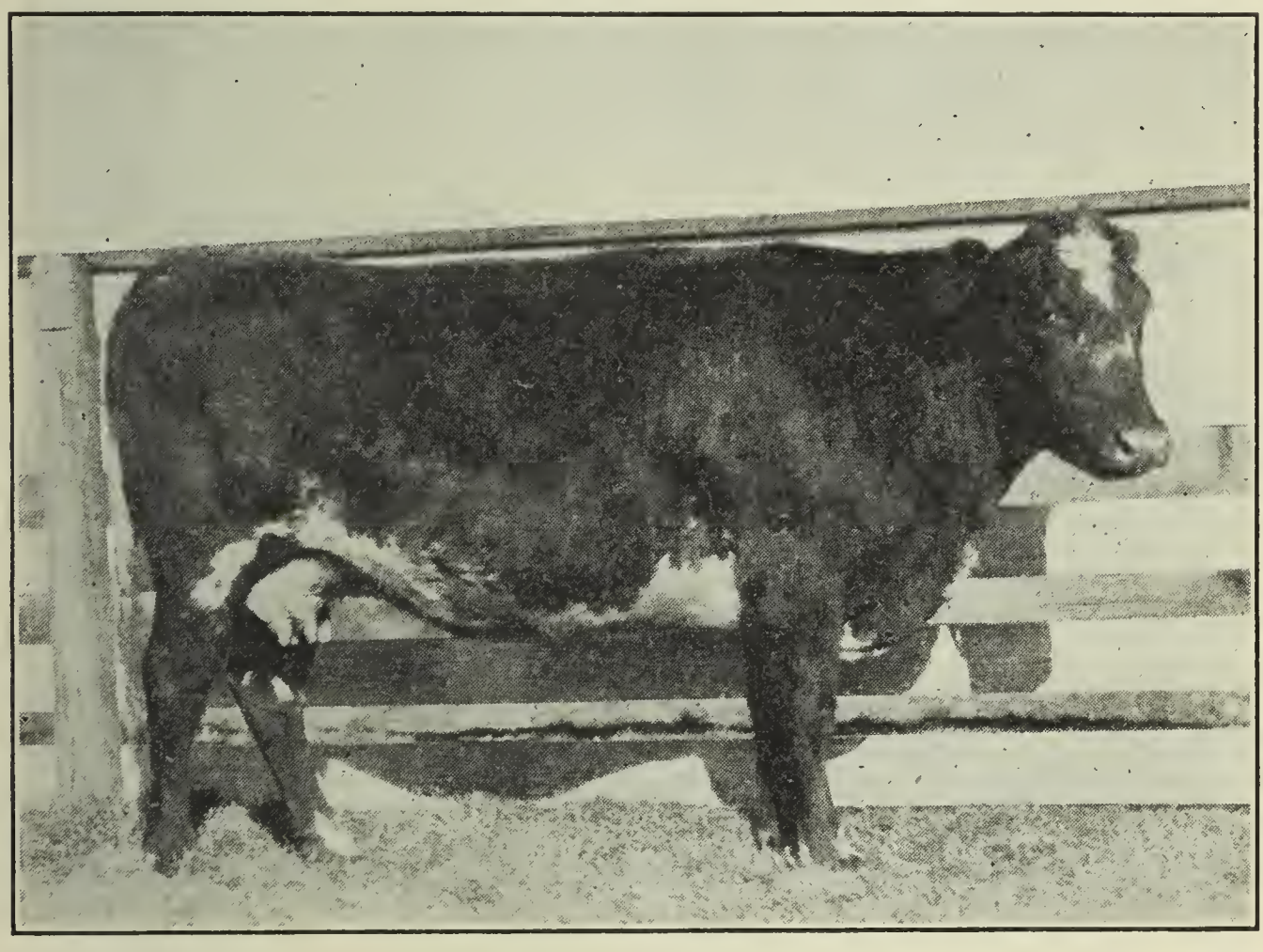

FIG. 5.—One of the original cows, typical of the foundation herd used at Sni-a-Bar Farms

As we observe the farm buildings the sincerity of the last remark becomes evident. Though neat and well painted, the buildings are of ordinary design and construction. There is not an imposing barn on the farm, most of the structures being cattle sheds; yet the well-planned arrangement, cleanliness, and atmosphere of prosperity convey the impression that the farm is above the average in buildings and equipment.

Pen 2.—Moving along to the second pen we find 10 red cows. These animals, we learn, are typical of the 200 original cows. They are 6 to 12 years old and are the type of foundation stock with which the demonstration started. The cows are by no means culls or inferior types. Though they are angular, we note a surprising amount of thick flesh and quality. They are cows such as any care-

ful farmer would select if he wished to start a herd with moderate means and decided to pick out his cows at a public stockyard.

The demonstration would be more striking, perhaps, if the original cows were grossly inferior, as of the canner grade, but it would not be the natural way for any sensible person to start unless he already owned such cows.

Pen 3.—This pen contains 10 cows of the first-cross daughters of the foundation cows and purebred sires. They are mature animals 5 to 9 years old. "These cows," an employee explains, "represent a practical type of farmer's cow."

Comparing them with the original cows in pen 2, it is noticeable that they are smoother, have better top and bottom lines, have heavier loins and hind quarters, and show greater refinement. The refinement is especially marked about the head and shoulders of this group, compared with the foundation cows.

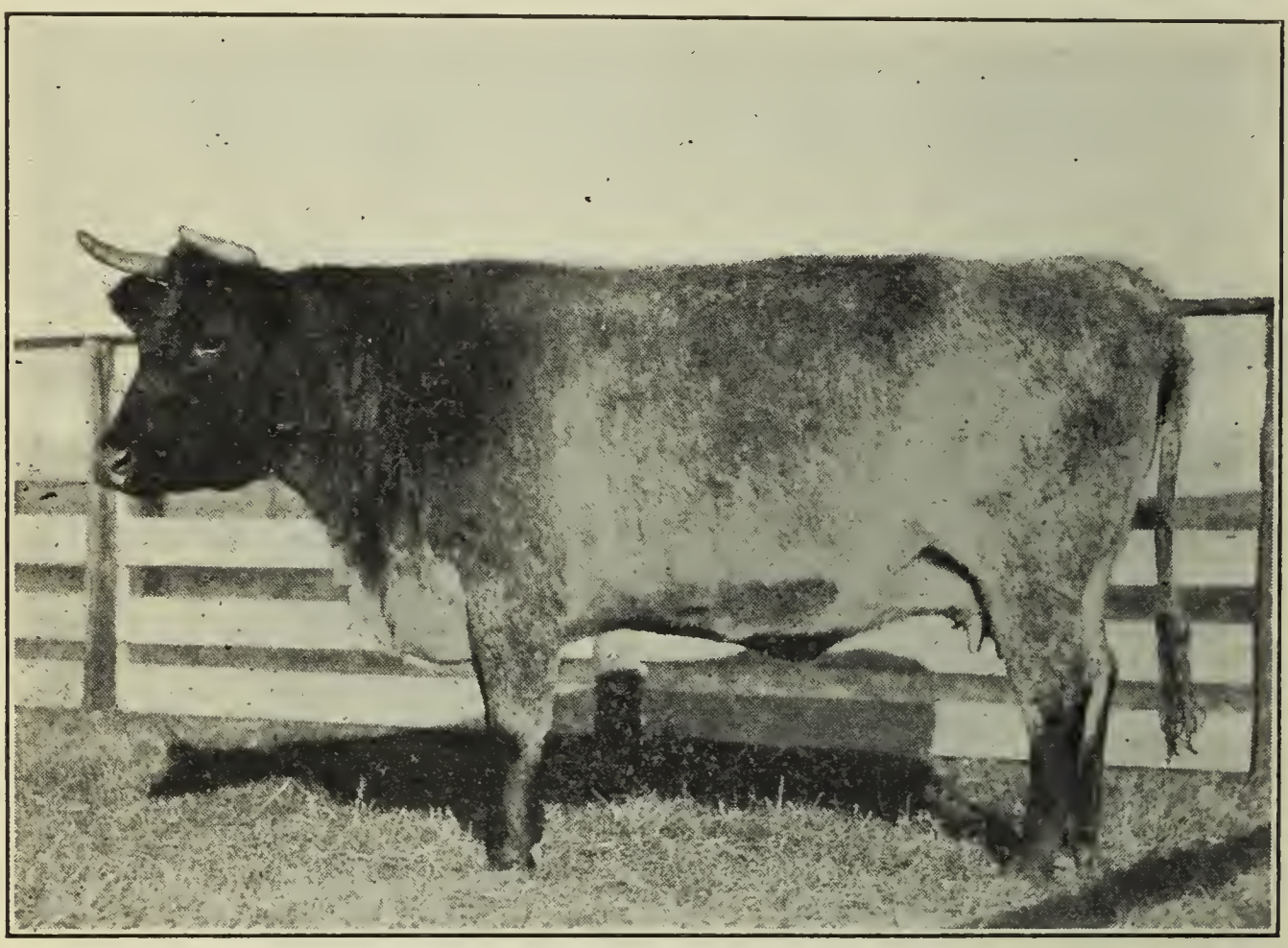

FIG. 6.—A first-cross cow obtained from the mating of a purebred Shorthorn bull and a foundation cow. She is well fleshed, blocky, and beefy. Though rough and lacking in quality, this cow is plainly better than the foundation cows

Pen 4.—The fourth pen contains 10 cows that would do credit to any farm. These are second-cross cows 5 to 7 years old, the placard states, representing the second generation from the foundation stock. Compared with the cows already seen, those in this pen are deeper bodied, have straighter top and bottom lines, are thicker fleshed, smoother over the hooks, rump, and shoulder, and are heavier in the loin and rib. Their legs are noticeably shorter and the heads still more refined than those of the cows in pen 3.

These second-cross cows show decidedly superior quality and uniformity over those in either of the preceding lots and more nearly approach the ideal type of practical beef cows. Each group observed has shown marked improvement over the preceding.

Pen 5.—The fifth pen, containing seven cows, shows the continued improvement brought about by purebred bulls, making the third generation or great-granddaughters of the original cows. This is a good occasion to use mental arithmetic. The first cross represented one-half Shorthorn blood, the second cross three-fourths, and the third cross seven-eighths. In other words these cows are seven-eighths full blood and only one-eighth common stock.

"These cows are all the third-cross females of breeding age on the farm," the man in charge explains, "consequently there has been no culling. With one exception they are producing their first calves." Though these cows are young, their smoothness, refinement, and general quality are clearly evident.

Pen 6.—Pen 6 contains 10 first-cross heifers 2½ to 3 years old, heavy with calf or with first calf at side. They show the same

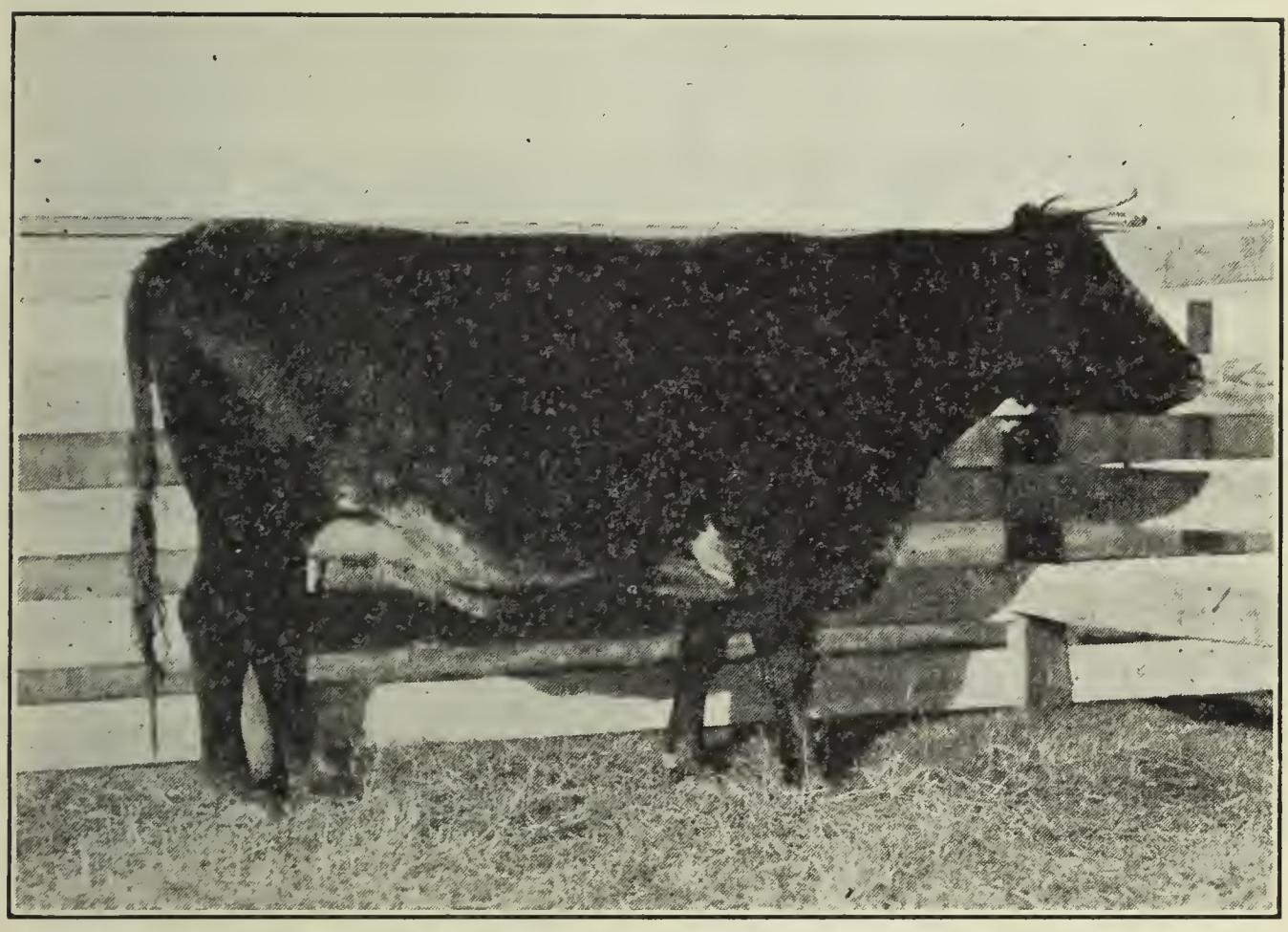

FIG. 7.—A second-cross cow showing progressive improvement from the use of purebred bulls. She is of desirable type, deep bodied, thickly fleshed, and shows evenness of lines

characteristics as the first-cross cows already observed and are included in the demonstration to illustrate the appearance of young female stock just before reaching productiveness.

Pen 7.—This pen has 10 second-cross heifers of the same age as those just seen, but smoother and more nearly uniform, besides showing greater depth of flesh. "These heifers," the attendant tells us, "are recommended as the type which farmers should breed." It is interesting to study also the suckling calves of these heifers. Even at their young age the sturdily built frames show clearly the influence of their purebred male parents.

Pen 8.—The sign "First-Cross Heifer Calves" on pen 8 scarcely prepares us for the animals the pen contains as we look into it. They are as large as some mature cattle, being well-developed heifers ranging from 8 to 14 months old, averaging close to a year.

Pen 9.—Pen 9 of second-cross calves makes an interesting comparison with pen 8, for here we see heifers slightly younger yet having deeper bodies, fuller heart girths, better frames, not so tall, but possessing greater refinement and superior conformation.

Pen 10.—The third-cross heifer calves seen in this pen average about a year old and for young cattle show their breeding and character to a very noticeable extent. This pen has a great many observers, partly because a county extension agent is discussing the stock for the benefit of a group of high-school boys he has brought with him.

"These calves have shorter legs, deeper bodies, fuller heart girth, and are smoother and broader in the back than those in the last two pens," he explains. The heifers in this pen and most of those in

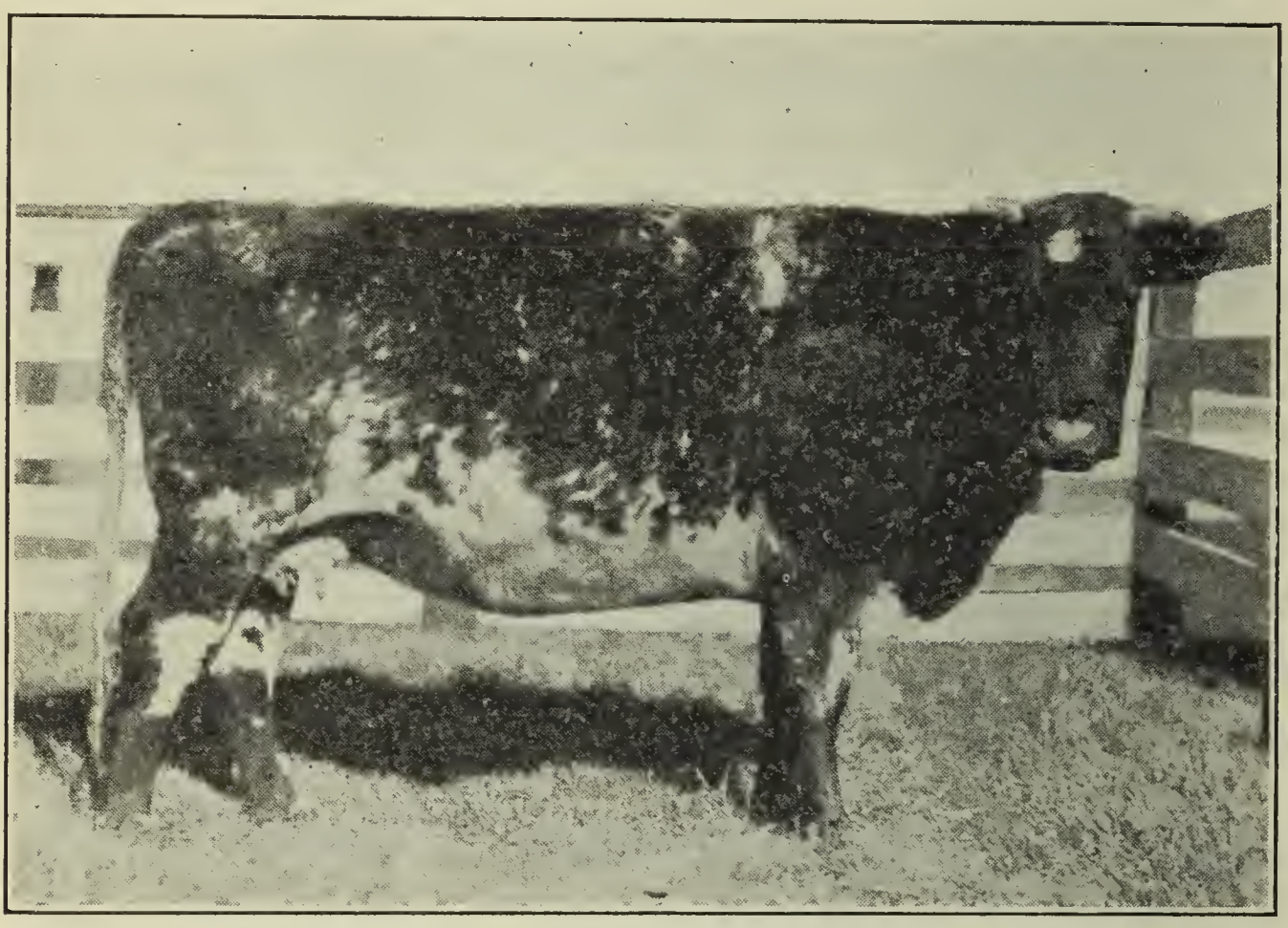

FIG. 8.—A third-cross cow, representing 87.5 per cent of Shorthorn blood (in addition to whatever she may have possessed originally). Though slightly flat over the loin, this animal is blocky, deep bodied, and thickly fleshed

pens 8 and 9, we learn from the attendant, are the type being selected for developing future breeding cows of the demonstration.

Pen 11.—Just as we are about to inquire where some Sni-a-Bar steers, of which we have heard so much, can be seen, we observe the sign "First-Cross Steer Calves" over pen 11. The pen contains 10 steers ranging from 11 to 13 months of age. An employee explains that these steers and also those in the next two pens have been on feed for seven to nine months, according to age. "There has been no culling," he adds, "and each pen shows the exact product of the cross to which it belongs. The three pens—11, 12, and 13—represent all the steers of these ages and breeding on the farm. Besides, the steers of these groups have all been fed together and all have had the same chance."

Pen 12.—To observe the difference, we study the 15 second-cross steers in pen 12. They have shorter legs, deeper bodies, are

smoother, thicker fleshed, and, though the same age, are plainly more early maturing.

Pen. 13.—The 11 third-cross steers in this pen, 13—which is also the last—show still more clearly the desirable type of early maturing beef steers. They are earlier maturing, smoother, shorter legged, broader backed, fuller in heart girth, heavier about the loins and ribs, and more thickly and evenly covered. A photographer is taking pictures of these steers, and as he gets them into position we notice that the heads are short and broad—true beef-type heads—and the eyes mild, not shifty or wild, as so often seen in common cattle. The well-fleshed loins are even more noticeable than at first observation, being conspicuously smooth and full. The buttocks are square and heavy; the hip bones do not protrude; and the whole body is squarely built.

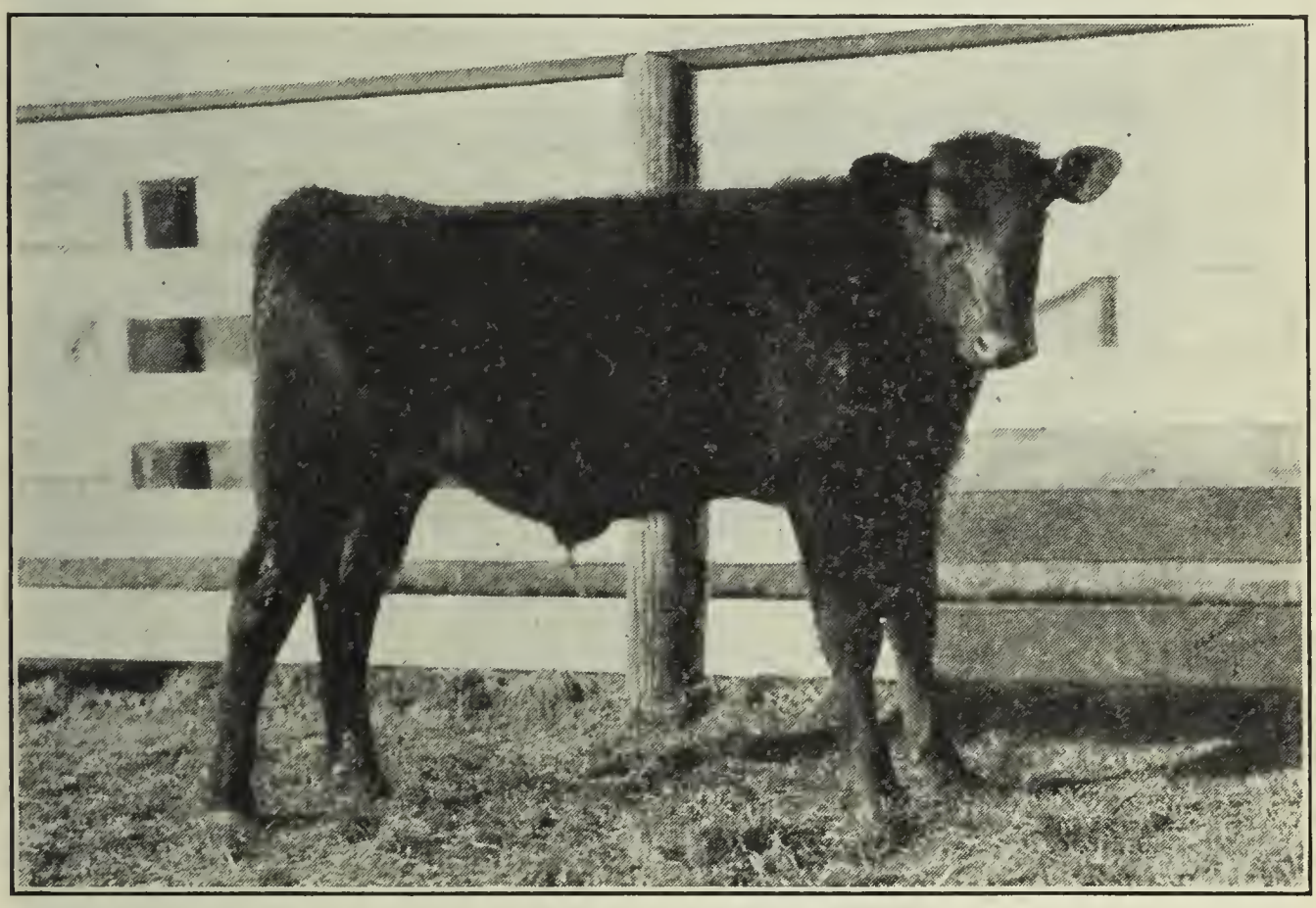

FIG. 9.—An original calf of unknown breeding, being the offspring of a foundation cow, bred before purchased by Sni-a-Bar Farms. This calf is leggy, rough, and cut up in the fore and rear flanks

Though the improvement from one generation to the next has been well marked, it is not until we contrast the blocky, third-cross steers in pen 13 with the original, angular cows that the influence of good breeding becomes truly impressive. In ordinary breeding work one seldom has the stock on hand at any one time to permit such comparisons. But the 13 consecutive pens at this remarkable demonstration enable us to see and study in a few hours breeding results extending over a period of 10 years.

THE SPEAKING PROGRAM

Reference to the printed program, received as we entered the grounds, shows that the speaking will begin shortly. We observe, too, that a steady stream of people is crossing the field between the demonstration pens and the large tent which serves as a field audi-

torium. Flags from a dozen "tops" flutter in the crisp, fall breeze. The tent is nearly filled, but we are in time to obtain seats.

The first speaker, representing the Nelson estate, welcomes the visitors. "Loud speakers" over the platform carry his voice to all parts of the tent. After introductory remarks explaining the purpose and present progress of the demonstration, the speaker points out the importance of bringing stock raising to a higher level of excellence.

"Everything on the expense side of farming is greater to-day than ever in the history of farming," he declares. "There is only one source from which returns or profits can come from the business of farming. That is the sale of the things raised on the farm.

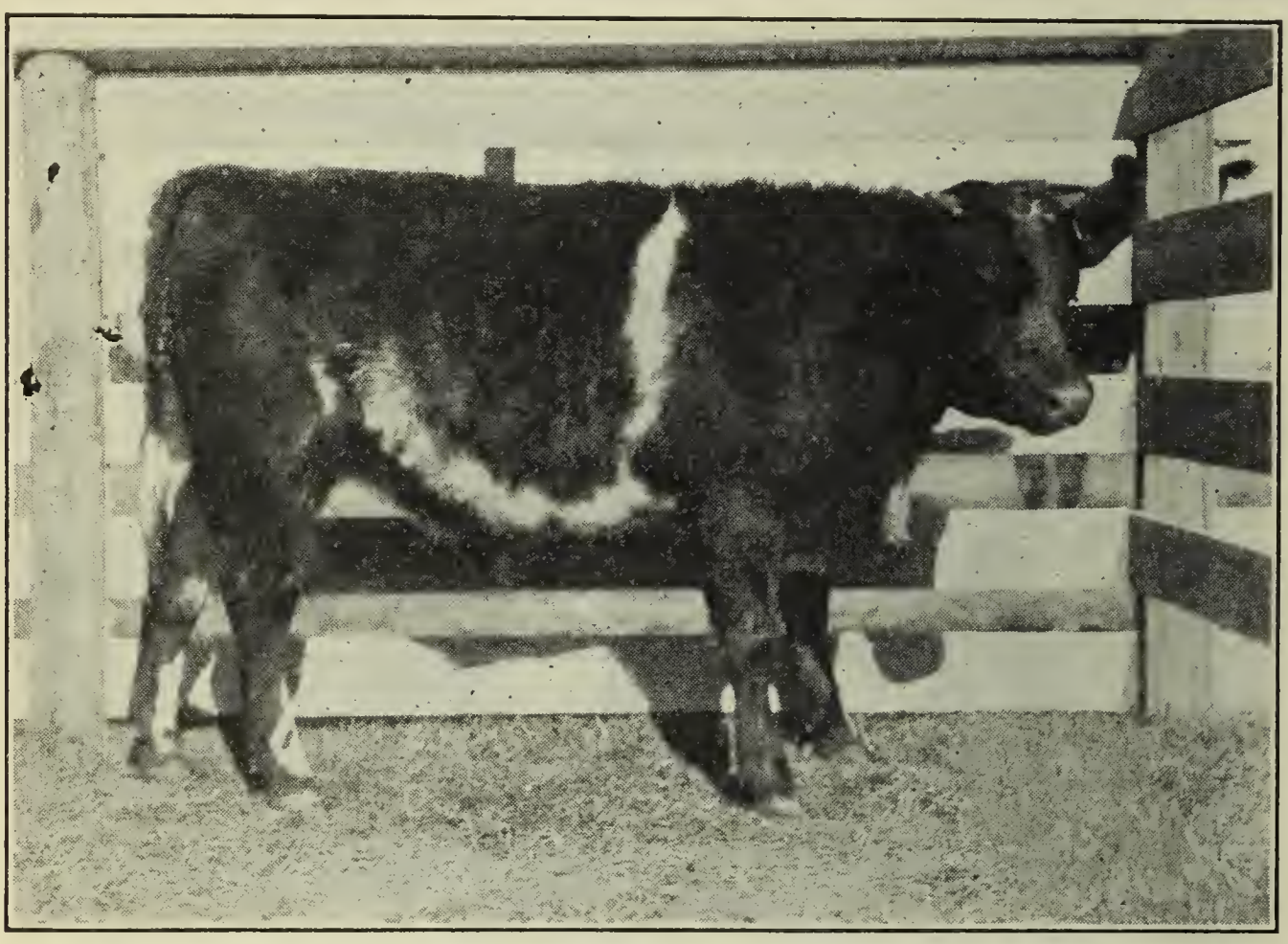

FIG. 10.—A first-cross calf, its sire being the purebred Shorthorn bull Modest King 950631 and its dam an original cow. This calf is compact, well fleshed, and shows good finish and quality

"It is notoriously true," he continues, "that it costs as much to raise poor cattle as to raise good cattle; yet, when the surplus cattle from the farm go to market, if they are of poor quality, they generally do not even pay for the breeding and raising, to say nothing of yielding a profit. Should we not, therefore, accept the lesson taught on these farms and stop the use of poor, scrub bulls which produce inferior calves? The use of good bulls will raise the quality of your herds each year and increase the sale value of the calves 25 per cent or more."

The next speaker, representing the United States Department of Agriculture, likens the Sni-a-Bar Farms demonstration to "a livestock proving ground to demonstrate the value of purebred sires. Operated with the single idea of improving native cattle through the consistent use of good, purebred bulls, Sni-a-Bar Farms is bringing out, in forceful fashion, the worth of the sire in the herd.

"I want to assure you," he continues, "that the livestock officials of the United States Department of Agriculture are watching the demonstration with the keenest interest. It has been an inspiration to know that back of the educational material the department has issued on the subject of purebred sires, there is a farm of this kind to which skeptics may be referred should any doubt arise as to the influence of heredity and pure breeding in livestock betterment."

"I feel that I am safe in stating that no single better-sires effort by individual or institution has so vividly indicated, in a language that stockmen clearly understand, the necessity for better sires as has Sni-a-Bar Farms."

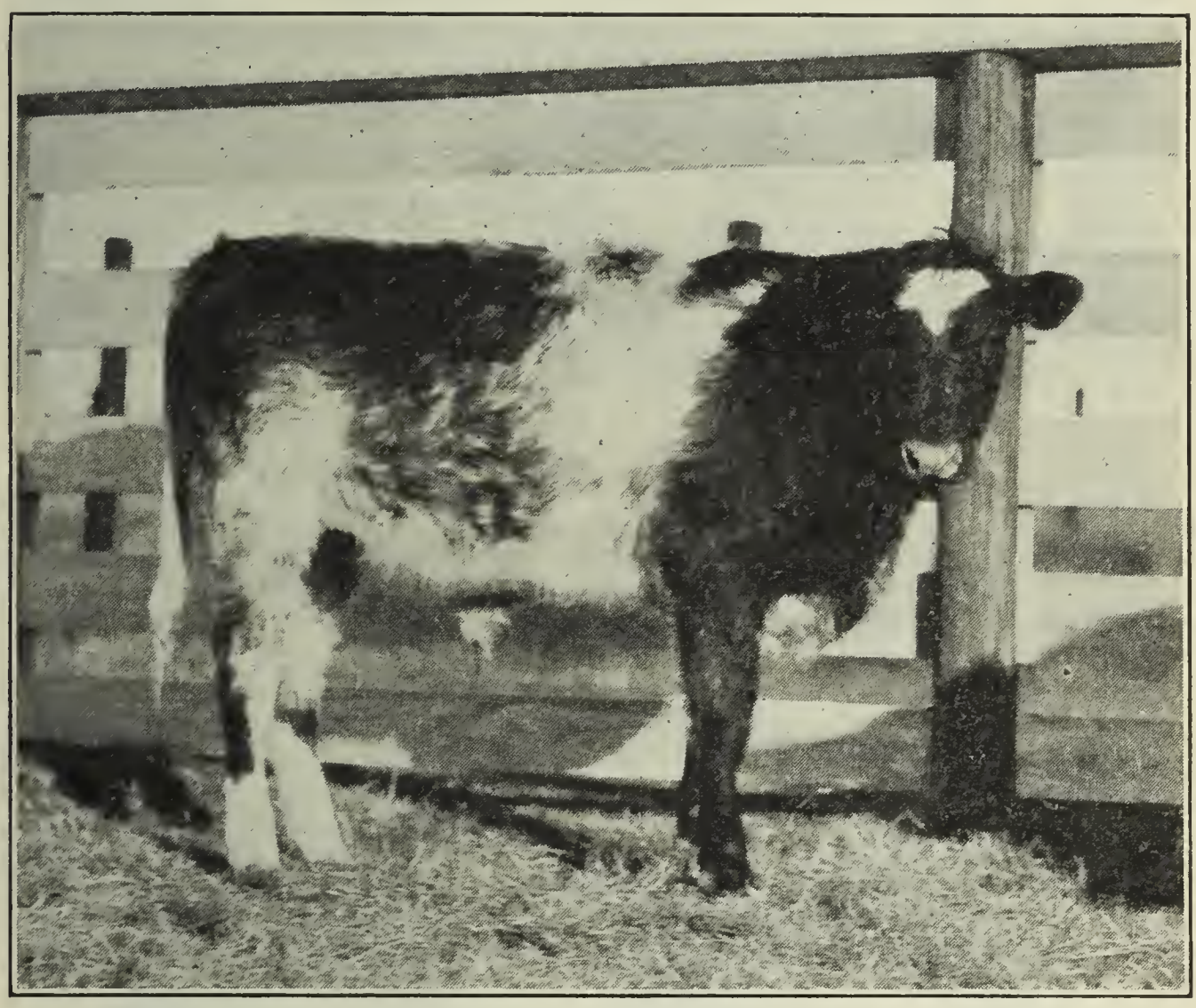

FIG. 11.—A second-cross calf, showing improvement in beef type over the first cross. Its sire was Maxwalton Mariner 1113592

He then discusses the economic side of livestock improvement, the higher dressing per cent of well-bred stock, and the better quality of meat. "It would seem," he continues, "that almost daily experience on our commercial cattle markets where producers are penalized several dollars a hundredweight for their failure to use better bulls would be sufficient in itself to have taught us the necessary lesson long ago. It would seem that such experiences would have eliminated the scrub bull as a factor in the industry. But we are forced to admit that such has not been the case. It is one thing for the commercial cattle markets to impress on a shipper that he has suffered a loss through poor quality, but it is an entirely different thing to show him clearly and convincingly just how to avoid a repetition. Our conception of what is now needed is the extending

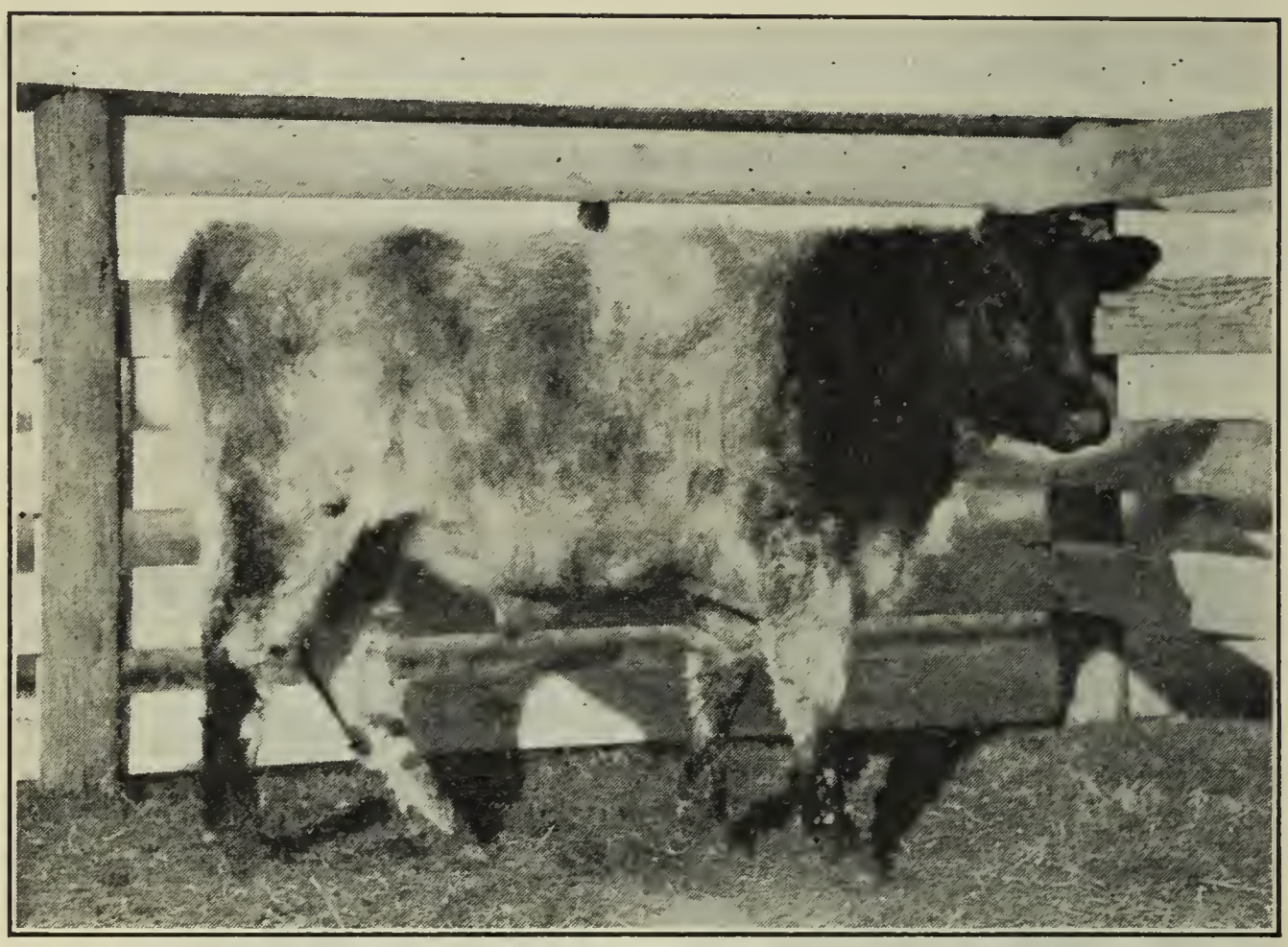

FIG. 12.—A third-cross calf, its sire being Edgecote Supreme 1045907 and its dam a second-cross cow. This steer calf is compact, blocky, and has deep body and good quality

of this information to large audiences of people, particularly those in distant parts of the country, by such means as motion pictures, lantern slides, and bulletins."

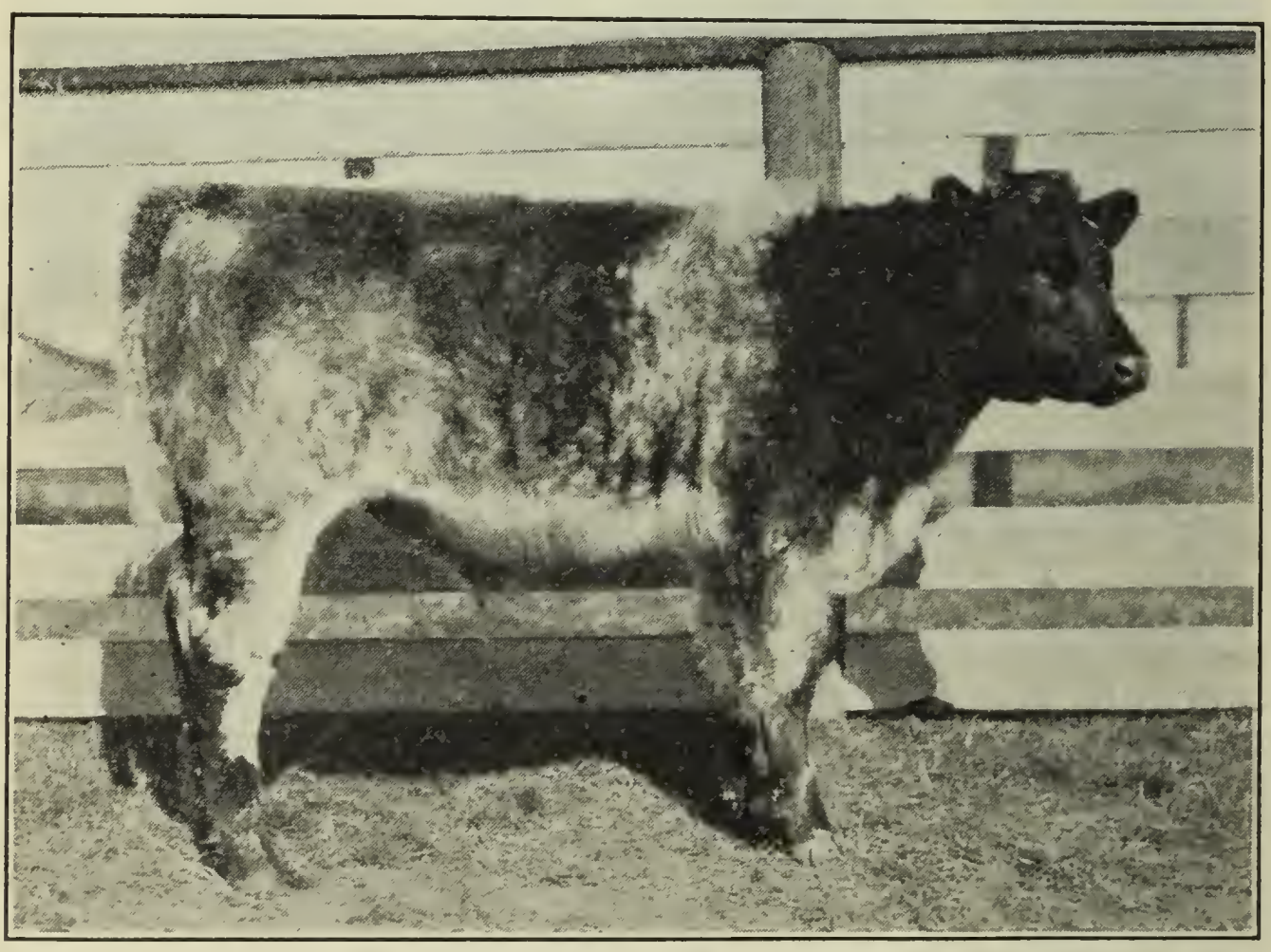

FIG. 13.—A fourth-cross calf, representing 93.75 per cent of known Shorthorn blood. Its sire was Edgecote Supreme 1045907 and its dam a third-cross cow. This calf, representing the average of the lot, is thickly fleshed, broad, smooth, blocky, and compact

Following this talk the president of the State board of agriculture speaks on the opportunities awaiting cattle owners who improve their breeding practices, cull their herds, and produce early maturing beeves of prime quality.

At the conclusion of the speaking program we join one of the six streams of men, women, and children which have just begun to flow into the refreshment tent. Here the management of the demonstration furnishes each guest a hearty luncheon, eaten picnic style, on the bluegrass. A surprisingly large number of women and children are on the grounds, making it apparent that the event appeals to the entire family. Nor, judging from the interest shown in the cattle and the speaking program, is it fair to assume that they came merely for a day's outing. Many of the boys and girls,

FIG. 14.—Thousands of visitors have attended the annual demonstrations to see the progressive results of grading up beef cattle with purebred sires. Admission is free, and the event is conducted for the benefit of the public

on being questioned, tell of their membership in calf clubs and probably derive more real benefit from the event than many of the adults.

Meanwhile motion-picture operators and camera men record the day's happenings for the benefit of persons far away but interested in this field day devoted to a greater and more profitable cattle industry.

JUDGING BEEF BULLS

After lunch a crowd of increasing size at the first demonstration pen attracts our attention. On inquiry we learn that an informal event not on the program is about to take place. It is a bull-judging contest open to all visitors. More than a hundred farmers and cattlemen, with score cards in hand, throng into the pen to "place" the eight purebred Shorthorn bulls in order of their excellence.

There are animated discussions, perplexed faces, decisions, and indecisions. But finally the scoring is completed and the crowd files out of the pen, having placed the bulls to the best of their ability. Then three authorities on beef cattle—professors of animal husbandry of the Missouri, Kansas, and Oklahoma colleges of agriculture—enter the pen and judge the bulls.

Cumberland Sultan, the bull placed first, is also the leader of the group on most of the farmers' scores. Later we learn that this judgment is sound, since the calves of this bull are among the best in the demonstration herd. One young farmer placed the bulls in the same order as had the judges, with the exception of the third and fourth, which he had in the reverse order. Others also proved to be good judges, but differed from the official rating on several of the bulls.

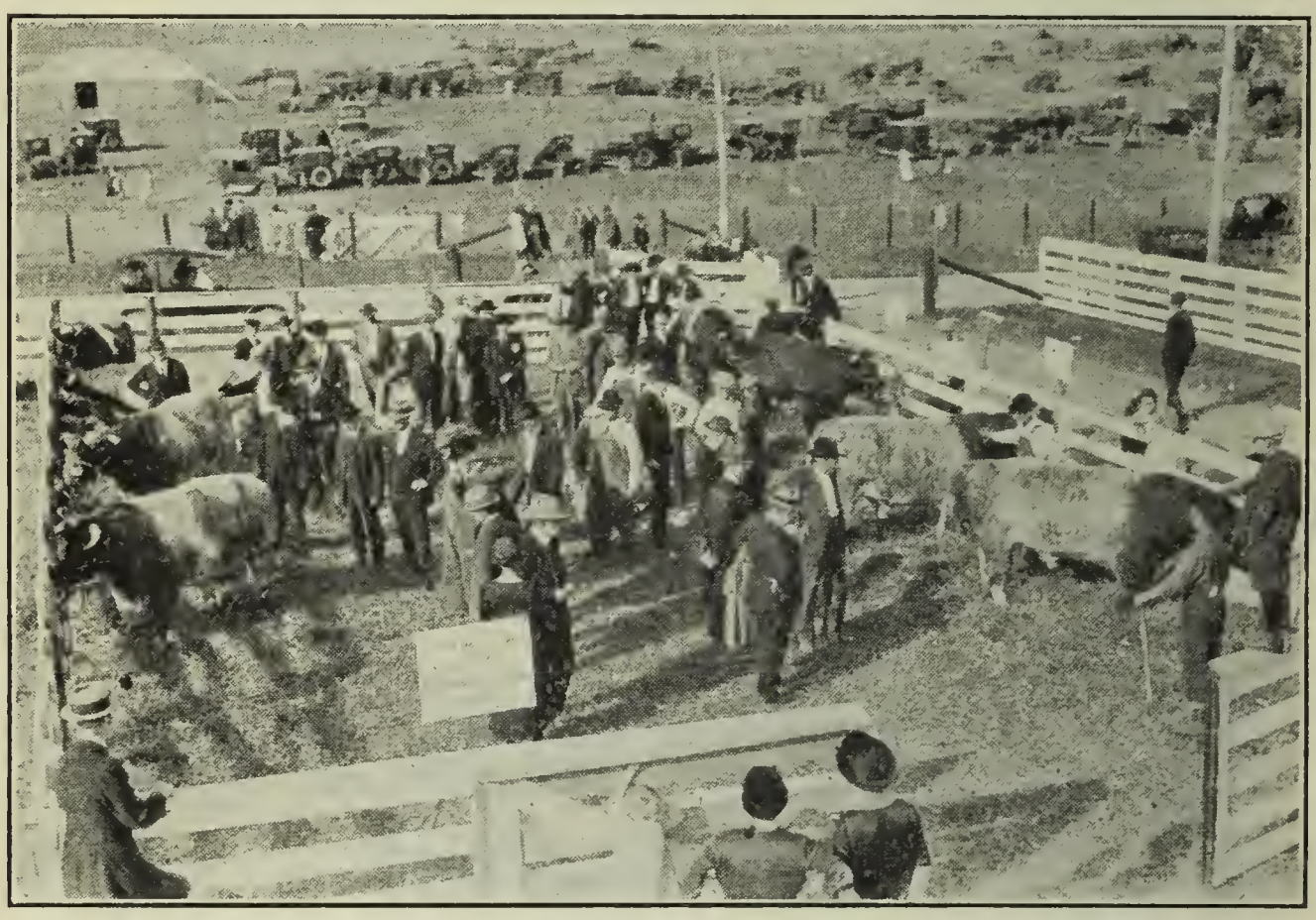

FIG. 15.—Visitors inspecting bulls in service during the 1924 demonstration at Sni-a-Bar Farms. An informal bull-judging contest was one of the features of the day

To clear up these differences of opinion the representative of the American Shorthorn Breeders' Association mounts a bale of hay and explains to the contestants and onlookers why the bulls were placed in the order given.

GOOD BREEDING BRINGS UNIFORMITY

Meanwhile another interesting talk, likewise informal, has been attracting a good-sized audience that has gathered about a pen of fattening steers a short distance from the demonstration pens. The steers under observation are a mixture of various crosses. A packer's representative attending the demonstration has just stated that good breeding as illustrated by the second, third, and subsequent crosses reduces the percentage of waste in beef-cattle carcasses.

"The packer gets the most money out of the carcasses which include the most meat of the choice cuts," he declares, "therefore

he can pay more for the steers that carry more of their meat over the loins and ribs.

"With better breeding," he continues, "you have another advantage the packer likes and for which he pays more. The more you feed and try to develop poor steers the more they differ. Differences you didn't notice when they were thin begin to appear. With good-quality steers like these," he states, pointing to several of the third cross, "it is just the opposite. When you feed these steers out, they will be practically all alike."

From the farm superintendent we learn also that every year the breeding herd is culled carefully, retaining the best cows and heifers. This plan gradually brings about improvement in the cows as well as

FIG. 16.—Appraising steers in the feed lot during a public demonstration. Officials of the meat trade are keenly interested in the demonstration, recognizing that its ultimate purpose is better beef

better and better steers. "Even at the first cross," he states, "the steers frequently weigh close to 1,100 pounds at about 18 months old, indicating that for their grade they have done well."

VISIT TO MEAT SHOP

By 4 o'clock in the afternoon the visitors have begun to disperse; but learning of a retail meat shop in Kansas City—an hour's ride from the farm—which recently obtained some carcasses of Sni-a-Bar steers, we decide to see some of the beef as the final stage of the demonstration.

The store is readily found. "I have handled Sni-a-Bar Farms meat before," the proprietor informs us as he leads the way to the cooler, "and can see as much difference in the meat of the different crosses as livestock judges can see between the living animals."

We examine the different cuts—loins, rounds, ribs, and chucks—noting the well-marbled, fine-grained, bright-red meat and creamy white fat. This is the ultimate product requiring skill and knowledge in breeding and feeding, but readily achieved by any progressive person willing to follow others who have blazed the way.

BUSINESS SIDE OF THE ENTERPRISE

Sni-a-Bar Farms conduct their breeding work in a manner so much like an official experiment station that many visitors expect to obtain detailed figures also on the cost of operation, and the expense of producing individual animals, including feeding costs. As already described, the stock is raised under typical farm conditions rather

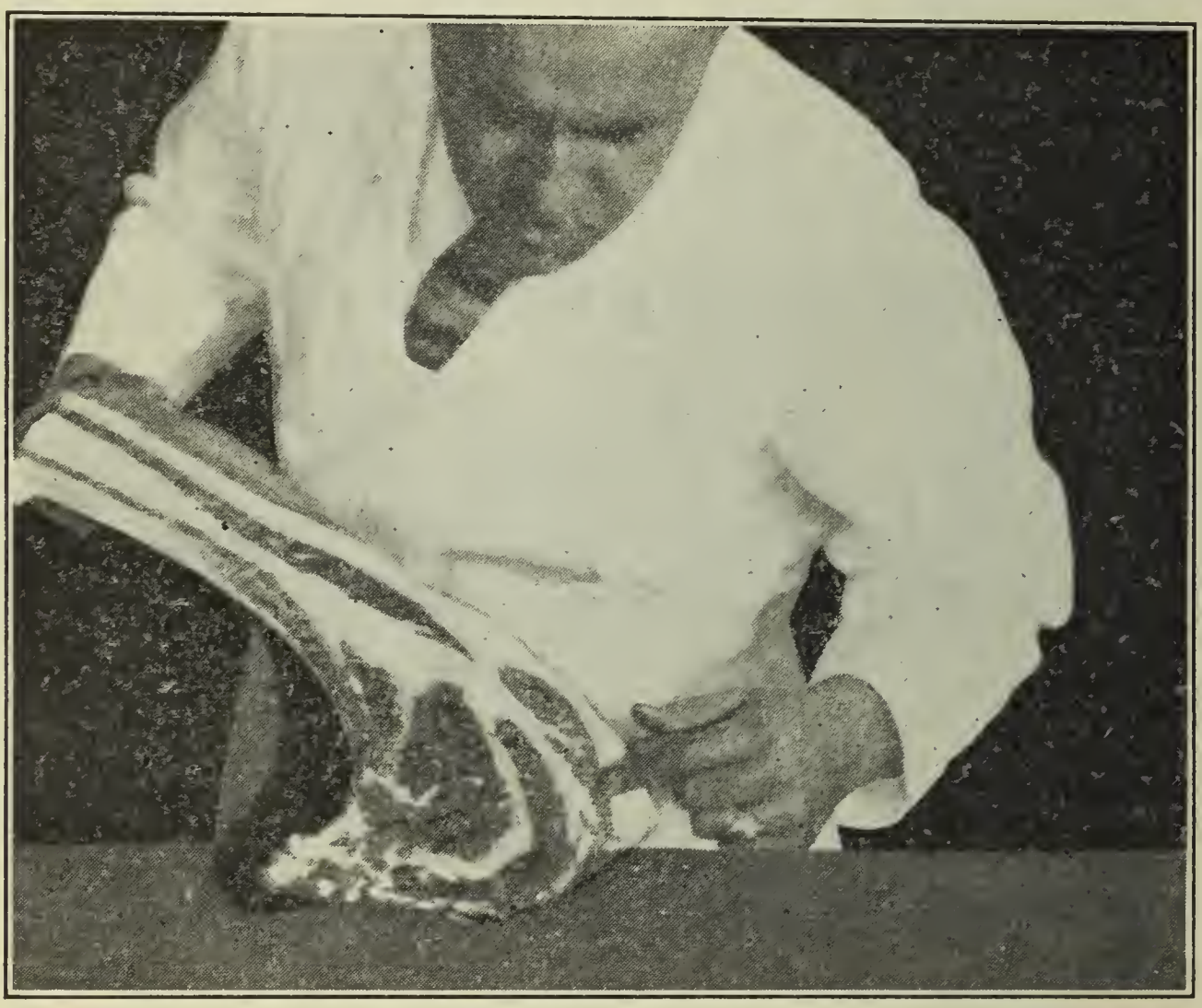

FIG. 17.—Prime rib roast from a second-cross Sni-a-Bar steer. The animal was 13 months old when slaughtered and weighed 1,126 pounds

than on a detailed experimental basis. The breeding activities, which are considered the essential part of the work, are recorded in great detail in accordance with the terms and intent of Mr. Nelson's plan. But the various crosses as well as the breeding stock, properly ear tagged, are allowed to mingle and use the same pastures in the same manner that a farmer would handle stock with a minimum of overhead cost for labor and supervision.

As a consequence, cost-of-production figures for stock marketed are not available except that the costs are practically the same as the expense of raising and feeding similar cattle in that territory. The trustees of the estate have not considered detailed production records a necessary part of the enterprise, believing that market returns are a sufficiently good index to the worth of the various classes and

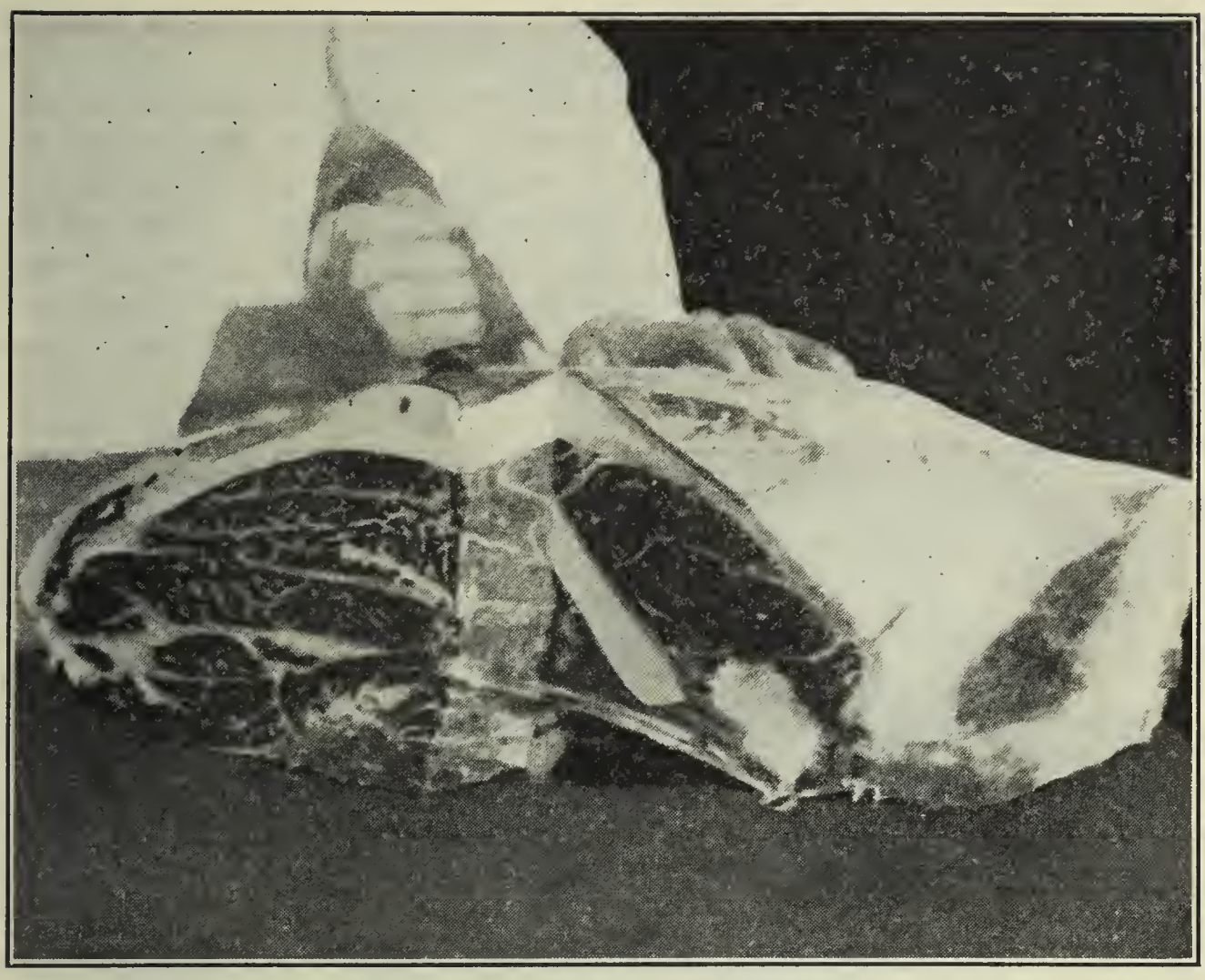

FIG. 18.—A chuck roast from second-cross steer. Even this so-called cheap cut shows excellent intermixture of fat and lean

FIG. 19.—Cutting a round steak from the same side of beef

crosses. Recently, records have been kept for some classes, but they are not complete enough to warrant publication.

In this connection a study of the marketing data in Table 2 shows in a striking manner that most of the Sni-a-Bar steers sold as yearlings rather than as older cattle. This is especially the case during the last 5 years of the 10-year period. The relative economy of feeding early maturing cattle is well known through practical experience. Gains of young steers on feed averaged more than 2 pounds daily and the quality was that of "baby beef" or closely approaching it.

FIG. 20.—Loin steak from same second-cross steer. Note the high degree of marbling

SUMMARY AND CONCLUSIONS

Ten years' experience in grading up beef cattle at Sni-a-Bar Farms has yielded the following results and conclusions:

The use of purebred sires of acceptable quality results in successive improvement in the quality of the calf crop, as shown by conformation and market price.

The greatest single step toward improved quality, compared with common stock, occurs in the first cross. Subsequent crosses increase quality and market value still more, though in less marked degree.

Quality and the best market prices are approximately in proportion to the number of crosses of pure breeding.

After the third or fourth cross the offspring compare very favorably with purebred stock in conformation, and only exceptionally good sires can bring about further improvement.

Steers sired by purebred bulls at Sni-a-Bar Farms have topped the market 16 out of 20 times and have 4 times been the highest for the year to date of sale on the Kansas City market for fat yearling beeves.

Early maturity is a conspicuous result of beef-cattle improvement through the use of purebred sires.

Steers raised at Sni-a-Bar Farms as a part of the demonstration have sold consistently for about $2 a hundred pounds more than the average of other cattle on the same market, and during the period of high prices in 1918 for as high as $5.95 a hundred above the market average.

Show-ring results are in general agreement with market preferences so far as indicated by the successful showing of Sni-a-Bar stock in market classes and by sales of similar cattle on the market.

The demonstration shows clearly that breeding is a dominant factor in the production of high-quality beeves and that good feeding and management will not return best results unless the element of good breeding is present also.

In grading up farm cattle the quality of calves is approximately in proportion to the individual excellence of the sires used, hence the importance of selecting bulls possessing qualities sought for in the offspring.

Attendance at the grading-up demonstrations has increased from about 500 persons in 1917 to 10,000 in recent years, indicating a wide public recognition of the practicability of raising better cattle.

ORGANIZATION OF THE UNITED STATES DEPARTMENT OF AGRICULTURE

August 17, 1928

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